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**Akita et al.**

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(54) **VIDEO-DISPLAY CONTROL DEVICE FOR CORRECTING A VIDEO SIGNAL AND CONTROLLING A BACKLIGHT**

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***H04N 5/57*** (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ..... ***H04N 5/57*** (2013.01); ***G02F 1/1336*** (2013.01); ***G02F 1/13306*** (2013.01); ***G09G 3/3406*** (2013.01); ***H04N 21/4318*** (2013.01); *G02F 2001/133601* (2013.01);
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CPC ..... G09G 2320/0646; G09G 2320/066; G09G 2320/0673; G09G 2330/021; G09G 2360/16; G09G 3/3406
USPC ..... 345/89, 690, 102
See application file for complete search history.

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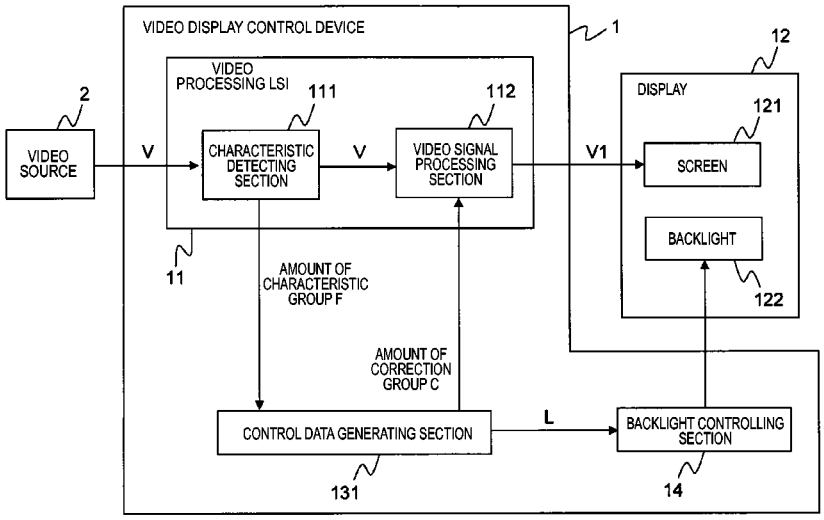
(57) **ABSTRACT**

In a video display control device, a control data generating section allocates a part of a dynamic range of a high gradation region of a video signal to a low gradation region, and a backlight controlling section controls a light emission luminance of a backlight so as to cancel an increase or decrease of a mean luminance of a video displayed on a screen in accordance with an increase or decrease of the mean luminance of a video signal after correction with respect to a mean luminance of the video signal.

**3 Claims, 7 Drawing Sheets**



(51) **Int. Cl.**

| | |
|---|---|
| ***G02F 1/133*** | (2006.01) |
| ***G09G 3/34*** | (2006.01) |
| ***G02F 1/1335*** | (2006.01) |
| ***H04N 21/431*** | (2011.01) |
| *H04N 21/44* | (2011.01) |

(52) **U.S. Cl.**

CPC . *G09G 2320/066* (2013.01); *G09G 2320/0646* (2013.01); *G09G 2320/0673* (2013.01); *G09G 2330/021* (2013.01); *G09G 2360/16* (2013.01); *H04N 21/44008* (2013.01)

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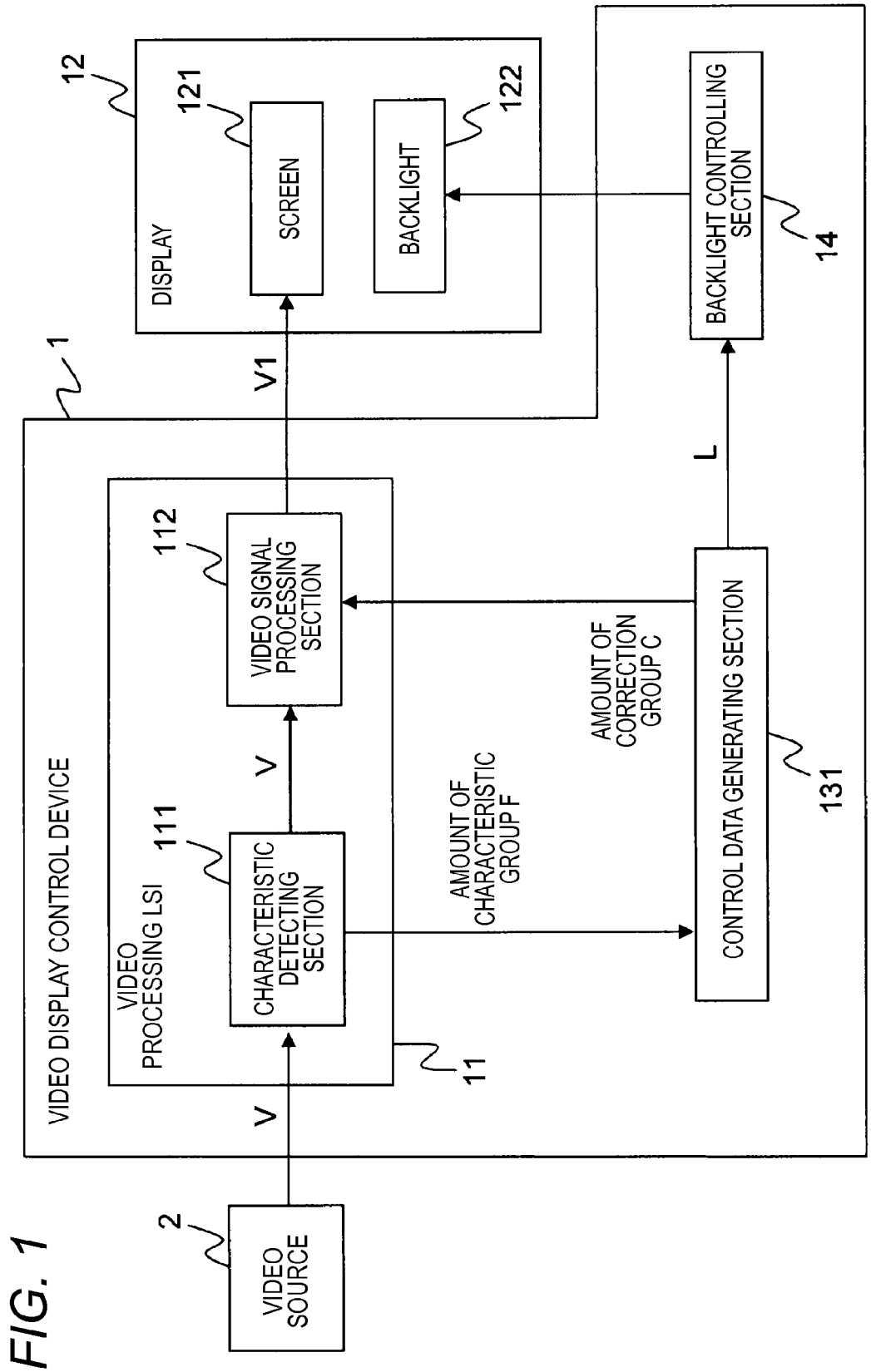
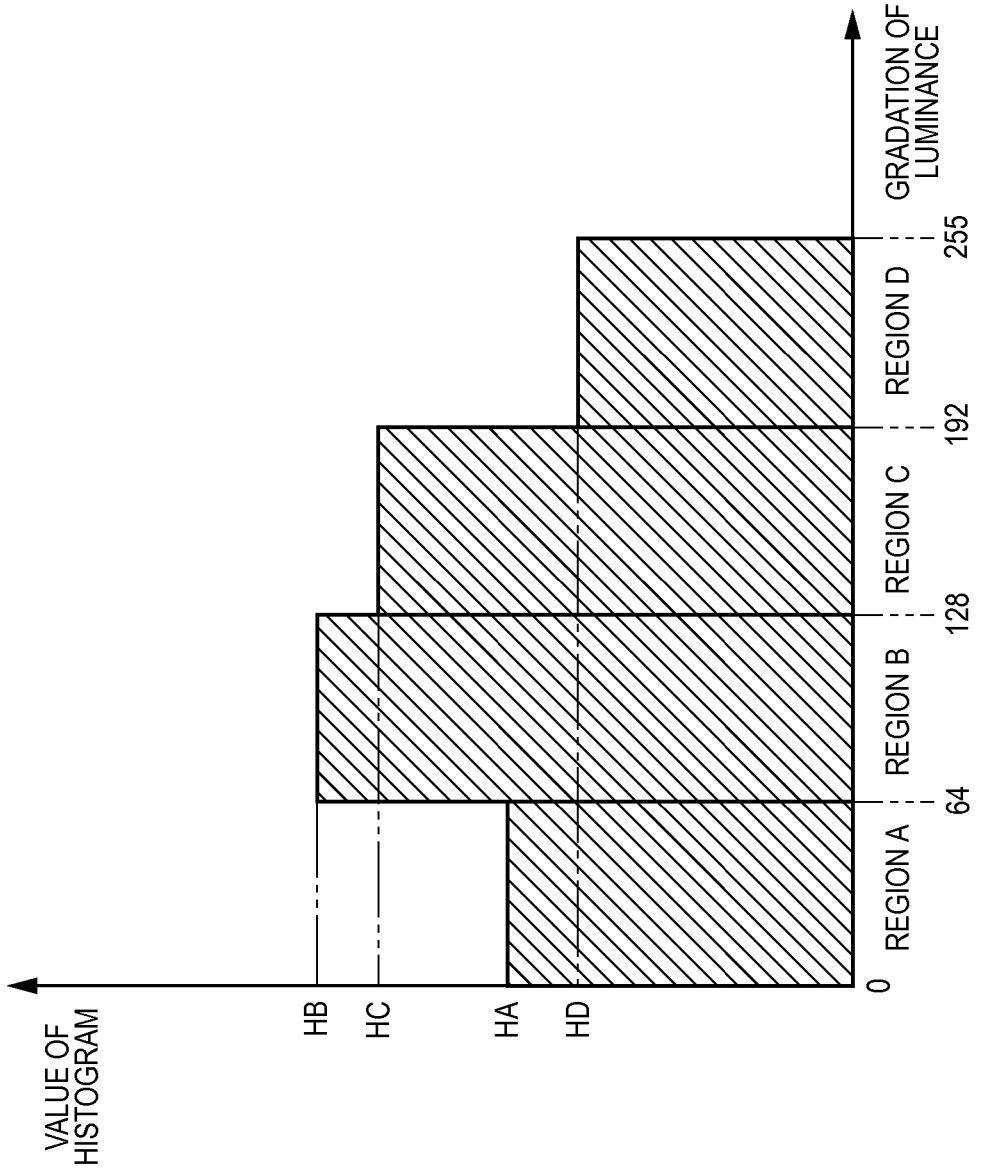

VIDEO SOURCE
2
V
VIDEO DISPLAY CONTROL DEVICE
1
VIDEO PROCESSING LSI
11
CHARACTERISTIC DETECTING SECTION
111
V
VIDEO SIGNAL PROCESSING SECTION
112
V1
DISPLAY
12
SCREEN
121
BACKLIGHT
122
AMOUNT OF CHARACTERISTIC GROUP F
AMOUNT OF CORRECTION GROUP C
CONTROL DATA GENERATING SECTION
131
L
BACKLIGHT CONTROLLING SECTION
14

FIG. 1

FIG. 2


VALUE OF HISTOGRAM
HB
HC
HA
HD
0
REGION A
64
REGION B
128
REGION C
192
REGION D
255
GRADATION OF LUMINANCE

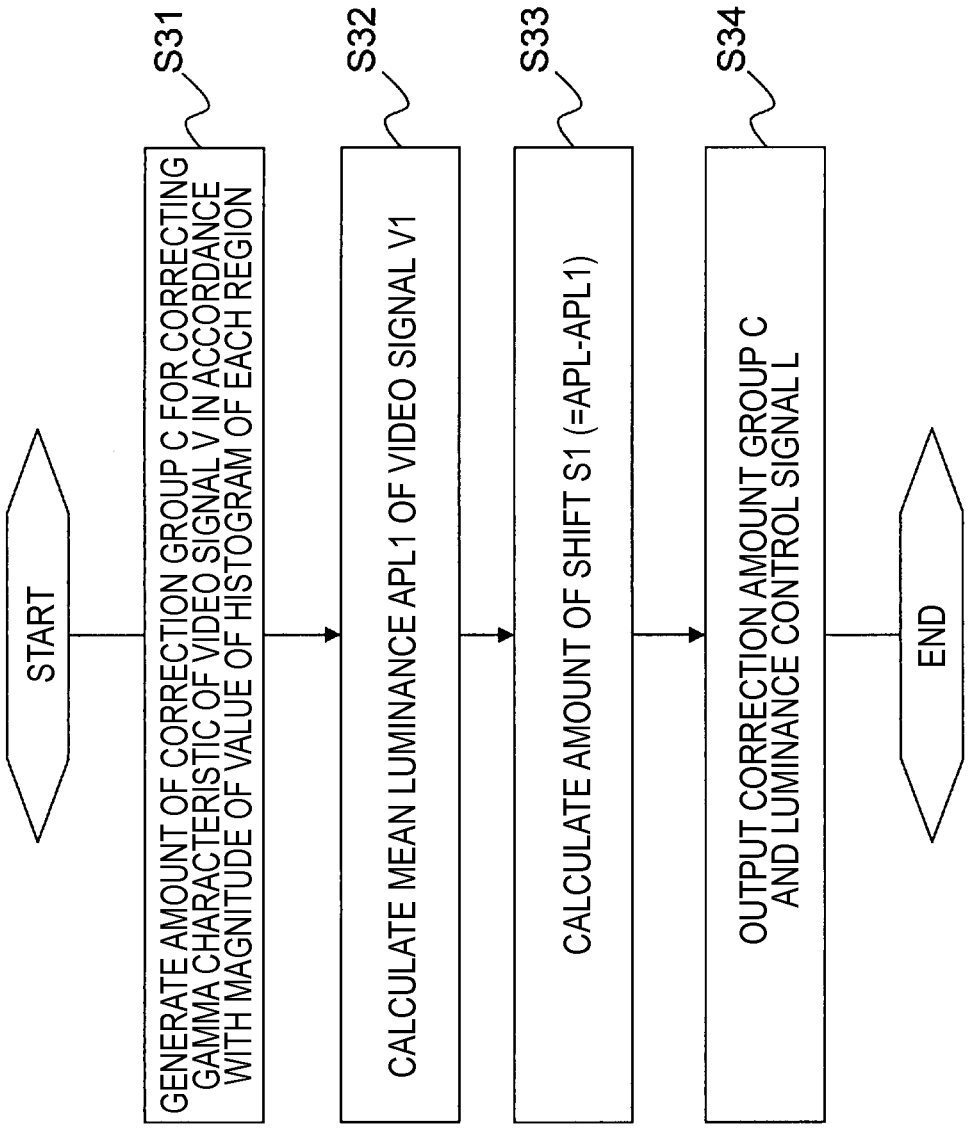
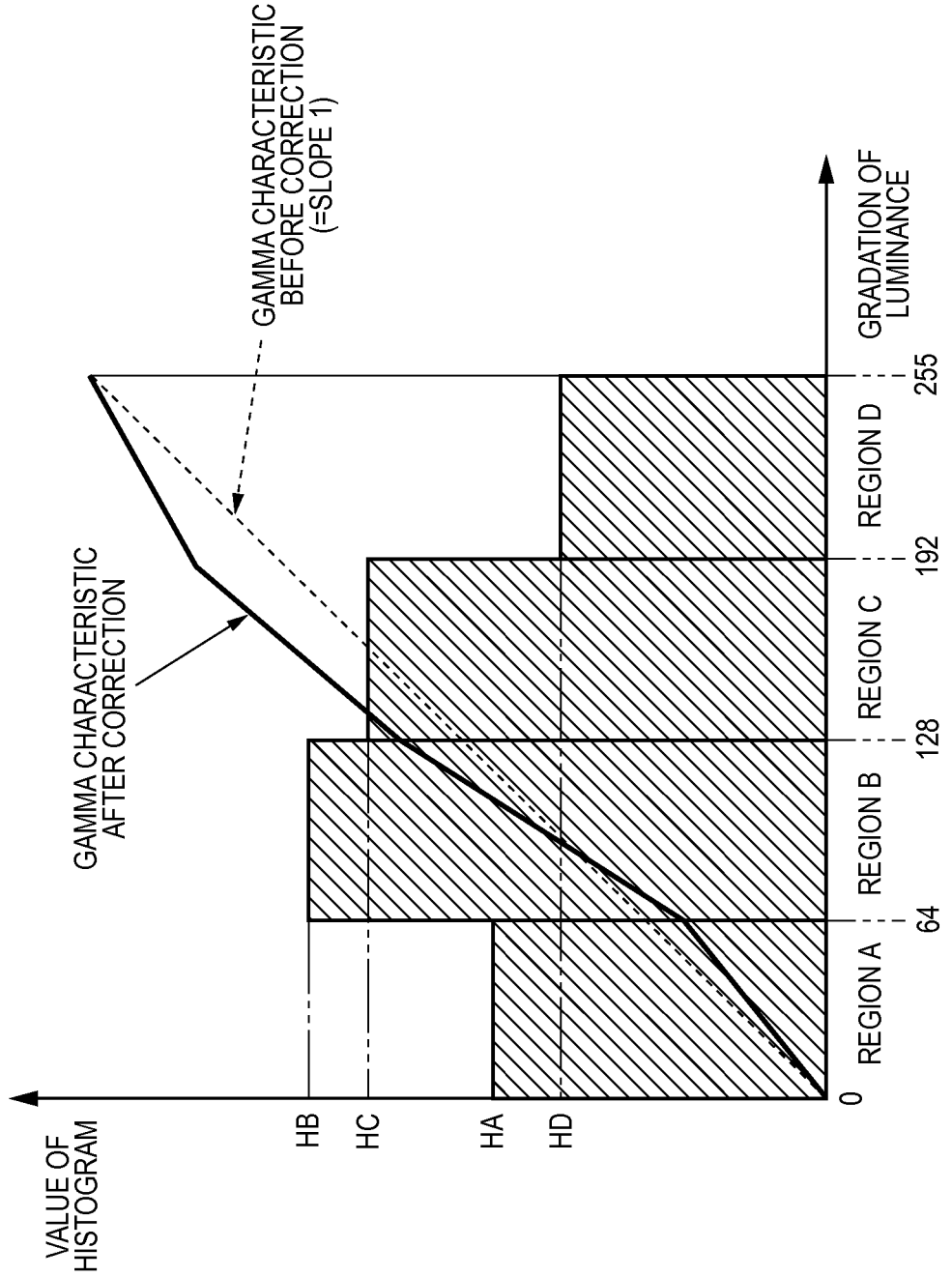

START
S31
GENERATE AMOUNT OF CORRECTION GROUP C FOR CORRECTING GAMMA CHARACTERISTIC OF VIDEO SIGNAL V IN ACCORDANCE WITH MAGNITUDE OF VALUE OF HISTOGRAM OF EACH REGION
S32
CALCULATE MEAN LUMINANCE APL1 OF VIDEO SIGNAL V1
S33
CALCULATE AMOUNT OF SHIFT S1 (=APL-APL1)
S34
OUTPUT CORRECTION AMOUNT GROUP C AND LUMINANCE CONTROL SIGNAL L
END

FIG. 3

FIG. 4


GAMMA CHARACTERISTIC BEFORE CORRECTION (=SLOPE 1)
GAMMA CHARACTERISTIC AFTER CORRECTION
VALUE OF HISTOGRAM
GRADATION OF LUMINANCE
HB
HC
HA
HD
0
64
128
192
255
REGION A
REGION B
REGION C
REGION D

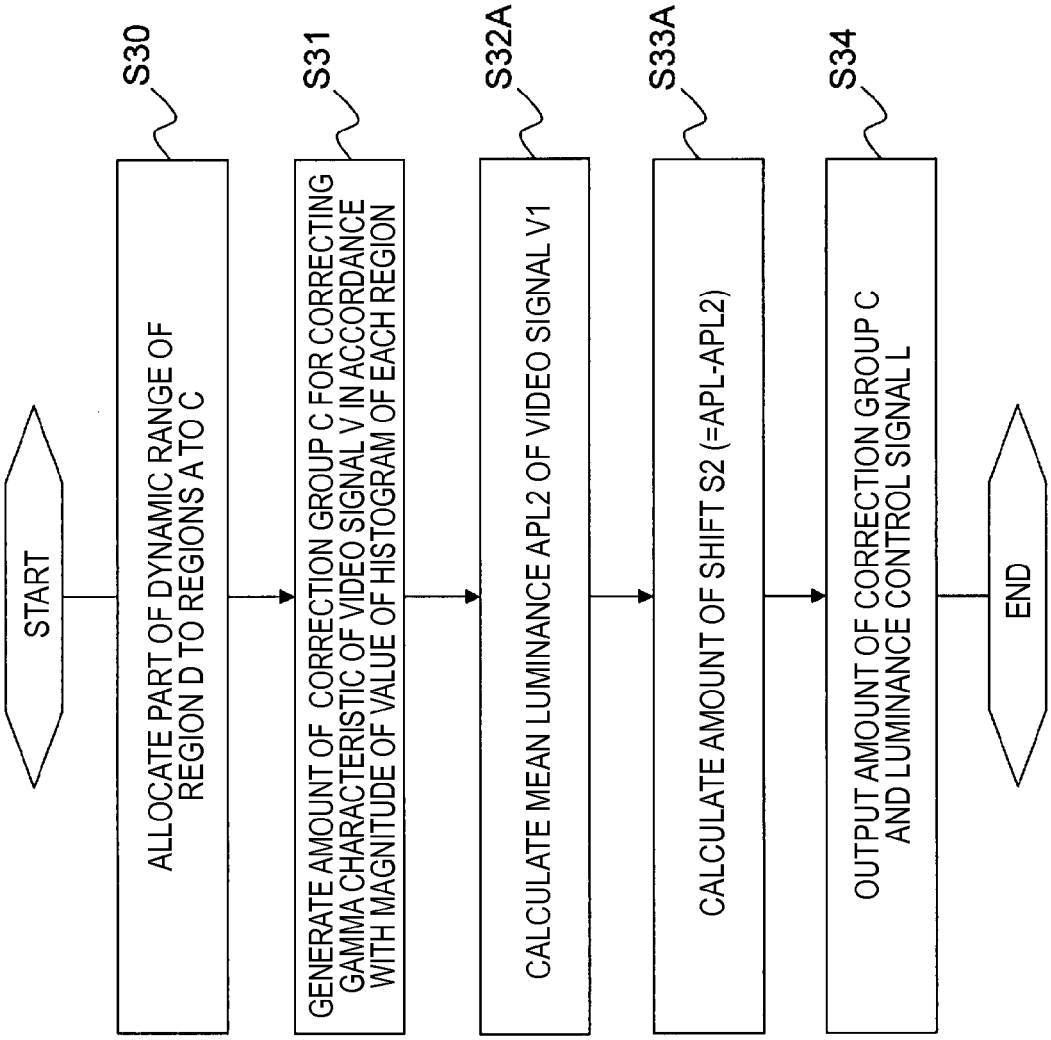

START
S30
ALLOCATE PART OF DYNAMIC RANGE OF REGION D TO REGIONS A TO C
S31
GENERATE AMOUNT OF CORRECTION GROUP C FOR CORRECTING GAMMA CHARACTERISTIC OF VIDEO SIGNAL V IN ACCORDANCE WITH MAGNITUDE OF VALUE OF HISTOGRAM OF EACH REGION
S32A
CALCULATE MEAN LUMINANCE APL2 OF VIDEO SIGNAL V1
S33A
CALCULATE AMOUNT OF SHIFT S2 (=APL-APL2)
S34
OUTPUT AMOUNT OF CORRECTION GROUP C AND LUMINANCE CONTROL SIGNAL L
END

FIG. 5

FIG. 6

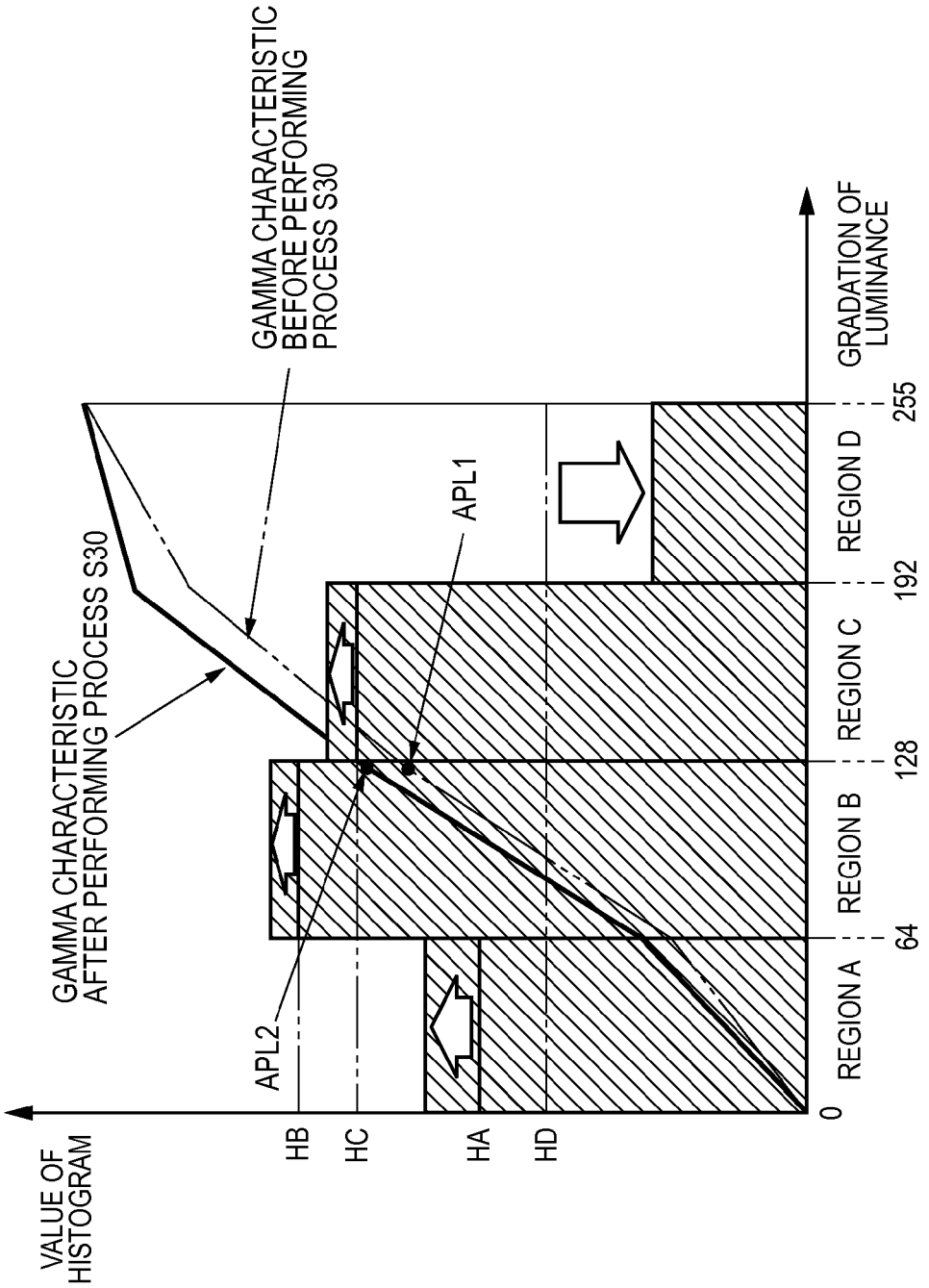
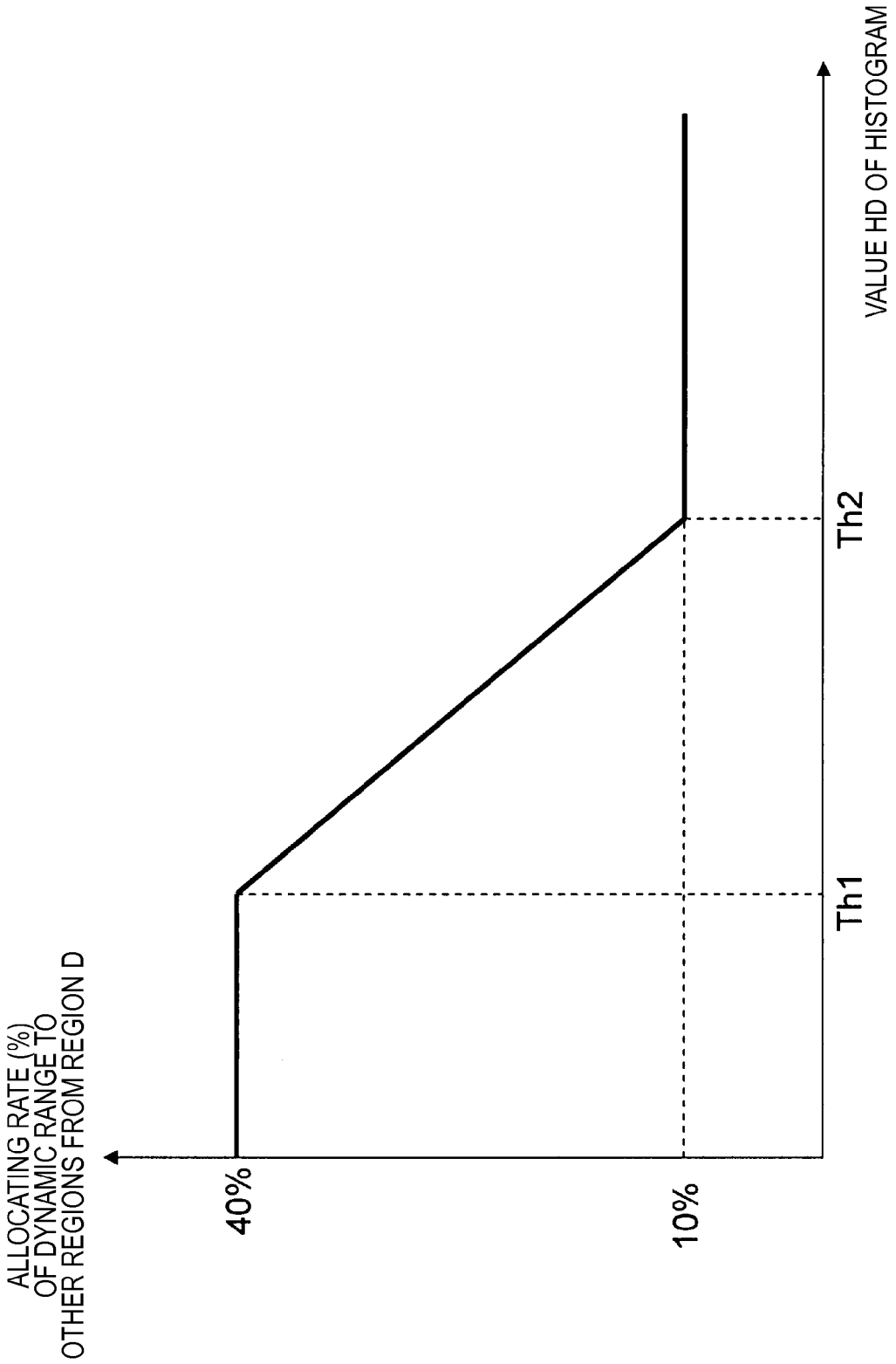

GAMMA CHARACTERISTIC BEFORE PERFORMING PROCESS S30
GAMMA CHARACTERISTIC AFTER PERFORMING PROCESS S30
APL1
APL2
VALUE OF HISTOGRAM
HB
HC
HA
HD
0
REGION A
REGION B
REGION C
REGION D
64
128
192
255
GRADATION OF LUMINANCE

FIG. 7


ALLOCATING RATE (%)
OF DYNAMIC RANGE TO
OTHER REGIONS FROM REGION D
40%
10%
Th1
Th2
VALUE HD OF HISTOGRAM

# VIDEO-DISPLAY CONTROL DEVICE FOR CORRECTING A VIDEO SIGNAL AND CONTROLLING A BACKLIGHT

## TECHNICAL FIELD

The present invention relates to a video display control device that controls a contrast of a video displayed on a display and a light emission luminance of a backlight.

## BACKGROUND ART

In a conventional display, it is common that a contrast of a displayed video or a light emission luminance of a backlight is adjusted by a manual operation of an user. In recent years, a method of dynamically controlling a contrast of a displayed video and a light emission luminance of a backlight in accordance with an input video signal varying with the lapse of time has been proposed in order to improve image quality or reduce consumption power (see, for example, Patent Document 1). In accordance with the above method, reduction of consumption power can be achieved while raising a contrast of a displayed video.

## PRIOR ART DOCUMENTS

### Patent Documents

Patent Document 1: JP-A-2006-145886

## SUMMARY OF INVENTION

### Problems that the Invention is to Solve

However, since controlling of a contrast of a displayed video and a light emission luminance of a backlight is performed on the basis of a maximum luminance of a display in the above method, the effectiveness is sometimes lowered in an actual video in which white characters such as captions, tickers or the like are partially superimposed.

The purpose of the invention is to provide a video display control device that can achieve improvement of a contrast and reduction of consumption power even when am amplitude of a video signal is equal to a width of a dynamic range.

### Means for Solving the Problems

In order to achieve the above purpose, a video display control device according to the invention is configured to control displaying of a video on a display having a screen and a backlight for emitting light toward the screen. The video display control device includes a characteristic detecting section that detects a mean luminance of a video signal input to the video display control device and a value of a histogram relating to a luminance, a control data generating section that generates control data for correcting the video signal based on values detected by the characteristic detecting section, a video signal processing section that corrects the video signal based on the control data generated by the control data generating section and outputs the corrected video signal to the display, and a backlight controlling section that controls a light emission amount of the backlight based on a difference between the mean luminance of the video signal and a mean luminance of the corrected video signal. The control data generating section generates control data which is adapted to cause the video signal processing section to perform correction of allocating a dynamic range of a high gradation region of the video signal to a low gradation region of the video signal. The backlight controlling section controls a light emission luminance of the backlight so as to cancel an increase or decrease of a mean luminance of a video displayed on the screen in accordance with an increase or decrease of the mean luminance of the corrected video signal with respect to the mean luminance of the video signal.



### Advantage of the Invention

In accordance with the video display control device of the invention, a dynamic range of a high gradation region is allocated to a low gradation region and a light emission luminance of the backlight is controlled so as to cancel an increase or decrease of a mean luminance of a video to be displayed on a screen in accordance with an increase or decrease of a mean luminance of a video signal caused by the allocating. Therefore, it is possible to achieve improvement of a contrast and reduction of consumption power while maintaining a visual brightness of a video at a roughly constant level even when an amplitude of a video signal is equal to a width of a dynamic range.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram showing structures of a video display control device and its peripherals according to an embodiment of the invention.

FIG. **2** is a schematic view showing an example of a histogram.

FIG. **3** is a flowchart showing an operation of a control data generating section **131**.

FIG. **4** is a graph showing examples of gamma characteristics pre and post correction of a video signal based on a value of the histogram shown in FIG. **2**.

FIG. **5** is a flowchart showing an operation of the control data generating section **131**, which is developed from the example shown in FIG. **3**.

FIG. **6** is a graph showing an example of a gamma characteristic after correction based on the value of the histogram shown in FIG. **4** and an example of a gamma characteristic after correction based on a value of a histogram obtained after performing a process of step S**30**.

FIG. **7** is a graph showing an example of an induction reference of an amount (a rate) of a dynamic range to be allocated to other regions from a region D.

## MODE FOR CARRYING OUT THE INVENTION

FIG. **1** is a block diagram showing structures of a video display control device and its peripherals according to an embodiment of the invention. As shown in FIG. **1**, a video source **2** such as a DVD player or the like is connected to an input side of the video display control device **1** and a display **12** is connected to an output side thereof.

The display **12** is, for example, a liquid crystal display and is provided with at least a screen **121** and a backlight **122**. A video according to a video signal V**1** transmitted from the video display control device **1** is displayed on the screen **121**. The backlight **122** is disposed at a back side of the screen **121**, and applies light toward the screen **121** in order to display a video. Incidentally, a light emission luminance of the backlight **122** is controlled by the video display control device **1**.

The video display control device **1** is provided with a video processing LSI **11**, a control data generating section **131** and a backlight controlling section **14**. The video processing LSI **11** applies a predetermined processing to a video signal V

received from the video source **2**, and outputs a video signal V**1** after processing to the display **12**. The video processing LSI **11** has a characteristic detecting section **111** and a video signal processing section **112**.

The characteristic detecting section **111** calculates an amount of characteristic group F of a video represented by the video signal V. The characteristic detecting section **111** outputs the calculated the amount of characteristic group F to the control data generating section **131**. The amount of characteristic group F is information including a mean luminance APL of the video signal V and a value of a histogram. In addition, the characteristic detecting section **111** outputs the video signal V to the video signal processing section **112** at its post-stage.

The mean luminance APL is a value obtained by dividing a total sum of luminance values of pixels in one frame indicated by the video signal V by a total number of pixels in the frame. The value of the histogram is a parameter indicating a gradient distribution of luminance in one frame of the video indicated by the video signal V. FIG. **2** is a schematic view showing an example of a histogram. In the embodiment, as shown in FIG. **2**, a luminance level is represented by 256 gradations (8 bits) from 0 to 255. The characteristic detecting section **111** divides 256 gradations indicating a luminance level of each of pixels forming one frame into four regions A to D and detects a value of a histogram of each of the regions.

In the descriptions below, a value of a histogram of the region A (gradations 0 to 63) is represented by HA, a value of a histogram of the region B (gradations 64 to 127) is represented by HB, a value of a histogram of the region C (gradations 128 to 191) is represented by HC, and a value of a histogram of the region D (gradations 192 to 255) is represented by HD.

The video signal processing section **112** corrects the video signal V on the basis of the amount of correction group C received from the control data generating section **131**. The video signal processing section **112** outputs the corrected video signal V**1** to the display **12**. An amount of correction group C is a parameter for correcting a gamma characteristic, and the detail thereof will be described later.

The backlight controlling section **14** controls a light emission luminance of the backlight **122** providing the display **12** on the basis of a luminance control signal L received from the control data generating section **131**.

The control data generating section **131** executes a program stored in a memory (not shown) so as to generate the amount of correction group C to be transmitted to the video signal processing section **112** and the luminance control signal L to be transmitted to the backlight controlling section **14**. FIG. **3** is a flowchart showing an operation of the control data generating section **131**. Hereinafter, a contrast improving process as a basic operation of the control data generating section **131** is described with reference to FIG. **3**.

As shown in FIG. **3**, the control data generating section **131** generates the amount of correction group C for correcting the gamma characteristic of the video signal V in accordance with magnitudes of the values HA to HD of the histograms of the video signal V included in the amount of characteristic group F obtained from the characteristic detecting section **111** (step S**31**). The amount of correction group C includes information indicative of slopes and intercepts of straight lines of the respective regions A to D indicating the gamma characteristic after the correction. Meanwhile, the four straight lines indicating the corrected gamma characteristic is referred to as "a line graph of gamma" in the descriptions below.

FIG. **4** is a graph showing gamma characteristics pre and post correction of the video signal based on a value of the histogram shown in FIG. **2**. Controlling is performed such that the gamma characteristic before processing represented by one straight line indicated by a dotted line in FIG. **4** is made to be the gamma characteristic (the gamma characteristic after processing) formed of four straight lines in which the slope of the region having the large value of the histogram is made to be large and the slope of the region having the small value of the histogram is made to be small in accordance with the values of the histograms of the respective regions A to D.

When the gamma characteristic of the video signal V based on the amount of correction group C is corrected, a dynamic range of the region of which the value of the histogram is relatively large, is enlarged, but a dynamic range of the region of which the value of the histogram is relatively small, is reduced. Therefore, the further the slope after the correction is larger than the slope before the correction, the more the dynamic range is enlarged, but the further the slope after the correction is smaller than the slope before the correction, the more the dynamic range is reduced.

Incidentally, as shown in FIGS. **2** and **4**, in a case that gradations 0 to 256 are divided into four regions A to D, the slopes of the straight lines indicating the gamma characteristics after the correction in the respective regions are calculated by using the following formulas. The characteristic detecting section **111** calculates the slopes of the straight lines of the respective regions on the basis of the values HA to HD of the histograms of the video signal V included in the amount of characteristic group F.

$$\text{Slope of region } A = HA/\{(HA+HB+HC+HD)\times 64\}$$

$$\text{Slope of region } B = HB/\{(HA+HB+HC+HD)\times 64\}$$

$$\text{Slope of region } C = HC/\{(HA+HB+HC+HD)\times 64\}$$

$$\text{Slope of region } D = HD/\{(HA+HB+HC+HD)\times 64\}$$

Next, the control data generating section **131** calculates a mean luminance APL**1** of the video signal V**1** of which the gamma characteristic is corrected, on the basis of the value of the histogram included in the amount of characteristic group F and the gamma characteristic after the correction (step S**32**). Next, the control data generating section **131** calculates a difference (an amount of shift S**1**) between the mean luminance APL**1** of the video signal V**1** and the mean luminance APL of the video signal V on the basis of formula (1) described below (step S**33**).

$$\text{Amount of shift } S1 = APL - APL1 \quad (1)$$

Next, the control data generating section **131** outputs the amount of correction group C including the slopes and the intercepts of the line graph of gamma calculated in step S**31** to the video signal processing section **112** (step S**34**). The amount of correction group C functions as a gamma correction parameter for the video signal processing section **112**. In addition, the control data generating section **131** outputs the luminance control signal L indicative of the amount of shift S**1** calculated in step S**33** to the backlight controlling section **14** (step S**34**).

The video signal processing section **112** corrects the video signal V on the basis of the amount of correction group C obtained from the control data generating section **131**, and outputs the video signal V**1** after the correction to the display **12**. In addition, the backlight controlling section **14** increases or decreases the light emission luminance of the backlight **122** by the amount of shift S**1** represented by the luminance control signal L from its reference luminance value on the

basis of the luminance control signal L obtained from the control data generating section **131**.

In the embodiment, since the mean luminance is lowered due to the correction of the video signal V in a case that the amount of shift S**1** is a positive value, the backlight controlling section **14** controls the backlight **122** so as to cause the light emission luminance to be higher than the reference luminance value by the amount of shift S**1**. On the other hand, in a case that the mean luminance is increased due to the correction by the video signal processing section **112**, since the amount of shift S**1** becomes a negative value based on the above formula (1), the backlight controlling section **14** controls the backlight **122** so as to cause the light emission luminance to be lower than the reference luminance value by the amount of shift S**1**.

In accordance with the embodiment described above, the 256 gradations indicative of the luminance levels of the respective pixels in the frame indicated by the video signal are divided into the plurality of regions, and the gamma characteristics of the video signal are corrected in such a manner that the slope of the region of which the value of the histogram is relatively large is made to be increased and the slope of the region of which the value of the histogram is relatively small is made to be decreased. Therefore, a wide dynamic range is allocated to a portion of the luminance level occupying a large area with respect to the screen. Therefore, even in a case that an amplitude of the video signal is similar to a width of the dynamic range because the video partially has white characters such as closed captions, tickers or the like superimposed therein, the contrast of the video can be improved without causing harmful effect such as whiteout or the like.

In addition, the light emission luminance of the backlight **122** of the display **12** is increased or decreased on the basis of the difference between the mean luminance APL of the video signal V and the mean luminance APL**1** of the video signal V**1** of which the gamma characteristic is corrected. Therefore, since the light emission luminance of the backlight **122** is controlled in accordance with the mean luminance, it is possible to maintain a visual brightness of the video on the screen **121** at a roughly constant level even when the mean luminance is changed due to the correction of the gamma characteristic.

FIG. **5** is a flowchart showing an operation of the control data generating section **131** which is developed from the example shown in FIG. **3**. Hereinafter, a process of improving a contrast and a process of reducing consumption power by the control data generating section **131** are described with reference to FIG. **5**. The control data generating section **131** performs a process of allocating a part of a dynamic range allocated to a region having the highest gradation to the other ranges (step S**30**). In the example shown in FIG. **2**, the control data generating section **131** performs a process of allocating a part of the dynamic range (the slope of the line graph of the region D) to the regions A to C.

Meanwhile, an amount of the dynamic range to be allocated from the region (the region D) having the highest gradation to the other regions (the regions A to C) can be a predetermined one, or one corresponding to a predetermined rate of the dynamic range of the region D. In addition, a distribution of the dynamic range to be allocated to each of the other regions (the regions A to C) can be equalized or weighted in a predetermined level.

FIG. **6** is a graph showing a gamma characteristic after correction based on the value of the histogram shown in FIG. **4** and a gamma characteristic after correction based on the value of the histogram obtained after performing the process of step S**30**. In the example shown in FIG. **6**, 40% of the dynamic range of the region D is distributed to the other regions (the regions A to C). The dynamic range distributed from the region D is distributed to the region A, the region B and the region C by respective rates of 50%, 25% and 25%.

As shown in FIG. **6**, by allocating the part of the dynamic range of the region D to the regions A to C, the dynamic ranges of the regions A to C are respectively increased. Therefore, the value of the histogram of the region D is decreased and the values of the histograms of the regions A to C are increased. In this condition, the control data generating section **131** performs the process of step **31** described with reference to FIG. **3**. As a result, a mean luminance APL**2** of the video signal V**1** corrected based on the amount of correction group C generated in step S**31**, becomes higher than the mean luminance APL of the video signal V. In other words, when the dynamic ranges of the regions A to C are enlarged by allocating the part of the dynamic range of the region D to the regions A to C, the luminance of the pixels belonging to the regions A to C are bit increased as a whole so that the mean luminance of the corrected video signal V**1** is increased.

Next, the control data generating section **131** calculates the mean luminance APL**2** of the video signal V**1** of which the gamma characteristic is corrected on the basis of the value of the histogram changed in step S**30** and the gamma characteristic after the correction (step S**32**A). Next, the control data generating section **131** calculates a difference (an amount of shift S**2**) between the mean luminance APL**2** of the video signal V**1** and the mean luminance APL of the video signal V in accordance with formula (2) described below (step S**33**A).

$$\text{Amount of shift } S2 = APL - APL2 \tag{2}$$

Next, the control data generating section **131** outputs the amount of correction group C including the slopes and the intercepts of the line graph of gamma calculated in step S**31** to the video signal processing section **112** (step S**34**). The amount of correction group C functions as a gamma correction parameter for the video signal processing section **112**. In addition, the control data generating section **131** outputs the luminance control signal L indicative of the amount of shift S**2** calculated in step S**33**A to the backlight controlling section **14** (step S**34**).

As shown in FIG. **6**, the mean luminance APL**2** of the video signal V**1** to which the distribution of the dynamic range (the process of step S**30**) is applied, is higher than the mean luminance APL**1** of the video signal V**1** to which the above process is not applied. Therefore, the amount of shift S**2** becomes a value which is increased in a negative direction as compared to the above described amount of shift S**1**. The backlight controlling section **14** controls the backlight **122** so as to decrease the light emission luminance to be smaller than the reference luminance value by the amount of shift S**2**. Consequently, the light emission luminance of the backlight **122** is decreased by the difference between the mean luminance APL**2** and APL**1** as compared to a case where the process of step S**30** is not performed.

In the above description, in accordance with the examples shown in FIGS. **5** and **6**, the dynamic range of the high gradation region (the region D in the example shown in FIG. **2**) is allocated to the low gradation regions (the regions A to C in the example shown in FIG. **2**), and the light emission luminance of the backlight **122** is decreased so as to cancel the increased amount of the mean luminance of the video signal generated in the above process. As a result, consumption power of the backlight **122** can be reduced with maintaining the visual brightness of the video on the screen **121** at a roughly constant level.

In addition, in contrast to a case where a linear gain is merely applied to a video signal, since a gain having a non-linear characteristic due to a line graph of gamma is applied to the video signal, it is possible to achieve reduction of consumption power with suppressing harmful effect in image quality such as whiteout or the like.

Therefore, since both of the process of improving a contrast and the process of reducing consumption power are performed, it is possible to achieve the reduction of the consumption power and the improvement of the contrast with maintaining the brightness of the whole screen at a constant level.

Meanwhile, in order to prevent flopping caused by varying of the parameter for gamma correction or the amount of shift of the amount of correction group C by each frame of the video, the video signal processing section **112** or the backlight controlling section **14** can perform a process or a control in response to the parameter for gamma correction or the amount of shift via a low-pass filter.

In the above description, since the gradations are divided into four regions, the line graph of gamma has four straight lines. However, the number of regions is not limited to four but can be two or more. Therefore, the line graph of gamma is formed of straight lines of which the number is the same as that of the regions.

In addition, the control data generating section **131** can change an amount of a dynamic range to be allocated to other regions from a high gradation region in accordance with a value of a histogram of the high gradation region. When controlling of decreasing the light emission luminance of the backlight **122** is performed by allocating a part of the dynamic range of the high gradation region to the other regions, a visual brightness of a low gradation region is roughly maintained at a constant level, but a peak luminance in the vicinity of a portion of white 100% is lowered. Therefore, a visual brightness in a scene including many bright pixels may be possibly lowered. However, by reducing an amount (a rate) of a dynamic range to be allocated to other regions from a high gradation region in a scene having many bright pixels, the visual brightness can be maintained at a constant level even in the scene having many bright pixels.

In step **S30**, the control data generating section **131** decreases the amount (the rate) of the dynamic range to be allocated to the other regions from the region D in a case that the value HD of the histogram of the region D is large, but increases the amount (the rate) of the dynamic range to be allocated to the other regions from the region D in a case that the value HD of the histogram of the region D is small.

FIG. **7** is a graph showing an example of an induction reference of the amount (the rate) of the dynamic range to be allocated to the other regions from the region D. As shown in FIG. **7**, the control data generating section **131** allocates 10% of the dynamic range of the region D to the other regions in a case that the value HD of the histogram is larger than a second threshold value Th**2**, but allocates 40% of the dynamic range of the region D to the other regions in a case that the value HD of the histogram is smaller than a first threshold value Th**1**. In addition, in a case that the value HD of the histogram is larger than the first threshold value Th**1** and smaller than the second threshold value Th**2**, the control data generating section **131** allocates 10 to 40% of dynamic range of the region D to the other regions, the higher the value HD of the histogram is, the smaller the rate is. However, in a case that the value HD of the histogram is larger than the first threshold value Th**1** and smaller than the second threshold value Th**2**, the control data generating section **131** can allocate a fixed rate of the dynamic range of the region D to the other regions, the fixed rate being between 10% to 40%.

While the invention is described in detail by referring to a specific embodiment, it is understood by those of ordinary skill in the art that various modifications and changes can be made without departing from the sprit and scope of the invention.

This application is based on Japanese Patent Application (JP-2010-189003) filed on Aug. 26, 2010, the contents of which are incorporated herein by reference.

## INDUSTRIAL APPLICABILITY

The video display control device according to the invention is suitable for a control device or the like of a liquid crystal display that displays a video according to a video signal.

## DESCRIPTION OF REFERENCE NUMERALS AND SIGNS

**1** video display control device
**11** video processing LSI
**111** characteristic detecting section
**112** video signal processing section
**12** display
**121** screen
**122** backlight
**131** control data generating section
**14** backlight controlling device
**2** video source

The invention claimed is:

**1**. A video display control device that controls displaying of a video on a display having a screen and a backlight for emitting light toward the screen, the video display control device comprising:

a characteristic detecting section that detects a mean luminance of a video signal input to the video display control device and a value of a histogram relating to a luminance;

a control data generating section that generates a control data for correcting the video signal based on values detected by the characteristic detecting section;

a video signal processing section that corrects the video signal based on control data generated by the control data generating section and outputs a video signal after correction to the display; and

a backlight controlling section that controls a light emission amount of the backlight based on a difference between the mean luminance of the video signal and a mean luminance of the video signal after the correction,

wherein the control data generating section generates control data which is adapted to cause the video signal processing section to perform correction of allocating a dynamic range of a high gradation region of the video signal to a low gradation region of the video signal,

wherein the backlight controlling section controls a light emission luminance of the backlight so as to cancel an increase or decrease of a mean luminance of video displayed on the screen in accordance with an increase or decrease of the mean luminance of the video signal after the correction with respect to the mean luminance of the video signal,

wherein in correction of allocating the dynamic range of the high gradation region to the low gradation region, the control data generating section determines an amount or a rate of the dynamic range of the high gradation region

allocated to the low gradation region in accordance with the value of the histogram of the high gradation region, and

wherein in the correction of allocating the dynamic range of the high gradation region to the low gradation region, the control data generating section increases an amount or a rate of the dynamic range allocated to the low gradation region in a case that the value of the histogram of the high gradation region is smaller than a first threshold value, and decreases the amount or the rate of the dynamic range allocated to the low gradation region in a case that the value of the histogram of the high gradation region is larger than a second threshold value.

**2**. The video display control device according to claim **1**,

wherein the control data generating section decreases the more the amount or the rate of the dynamic range allocated to the low gradation region in accordance with a magnitude of the value of the histogram of the high gradation region, in a case that the value of the histogram of the high gradation region is larger than the first threshold and is smaller than the second threshold value.

**3**. The video display control device according to claim **1**,

wherein the control data indicates a gamma characteristic of the video signal after correction performed by the video signal processing section, the gamma characteristic being determined in accordance with a relative magnitude of a value of a histogram of the high gradation region and the value of the histogram of the low gradation region, and

wherein the gamma characteristic of the video signal after the correction has a feature that the slope of the region of which the value of the histogram is relatively large, is made larger than the other.

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